



**US Army Corps
of Engineers®**

Engineer Research and
Development Center

Ice Jam Database

Technology

The [Ice Jam Database](#), developed at the Engineer Research and Development Center's [Cold Regions Research and Engineering Laboratory](#) (ERDC-CRREL), is a compilation of freezeup and breakup ice events in the United States that provides engineers and state officials with the information needed to understand, anticipate, and alleviate the damages caused by ice jams. Currently it contains information on more than 15,100 ice events in 42 states and the District of Columbia from 1780 to the present. It provides a reliable resource to research previous ice jams, including river name, latitude and longitude, U.S. Geological Survey (USGS) hydrologic unit code or USGS gaging station number if appropriate, city and state, date and type of jam, a brief description of the situation, and publications with information on the particular jam.

A map-based version of the database can be reached through the [CRREL Ice Jam Clearinghouse](#), which contains additional technical information on ice jams.

Problem

Ice jams cause more than \$100 million in damages annually in the United States, and the potential exists for death or serious injury. They can be accompanied by severe flooding and damage to low-lying areas and roads, bridges, buildings, and homes, and they limit emergency and medical relief to affected areas. Ice covers and jams also block hydropower and water supply intakes, delay or stop navigation, damage riverine structures such as locks, dams, bridges, dikes, levees, and wingwalls, and decrease downstream discharge. Ice movement and ice jams also can severely erode streambeds and banks, with adverse impacts on fish and wildlife habitat.

Ice jams form in early winter as ice formation begins or in spring when the ice cover begins to break up and move downstream. The likelihood of an ice jam is increased by local river geometry, weather characteristics, and floodplain land-use practices. The sudden increase in water during an ice jam can occur rapidly, leaving little time to react to the situation or to prevent costly damages.



A 1992 ice jam flooded Montpelier, Vermont, under four feet of water and caused \$5 million in damages. Some people were stranded on top of cars and in buildings.

Implementation Cost	There is no charge for using or inputting data to the Ice Jam Database.
Benefits/Savings	<p>CRREL's Ice Jam Database can help engineers and state officials prevent or alleviate ice jams by providing data about past events, the conditions surrounding their formation, and the actions taken in response to the event. It is a useful tool for characterizing ice jams in specific areas and for providing information during ice jam flood situations.</p> <p>The database provides a source of information regarding the success or failure of various emergency response efforts undertaken by engineers and relief officials during previous ice jam events. The design of ice mitigation measures also relies on information collected in the database, and this information can be used to predict and assess conditions that may increase the probability of ice jam formation. Regulatory agencies can use the database to assess whether ice impacts should be considered in issuing permits. This is increasingly important with the rise in the number of dam removals nationwide.</p>
Status	<p>The Ice Jam Database is incomplete, so there are several biases in the data. The database relies heavily on USGS sources, and in particular on data collected for the magnitude and frequency of flood report series, so the most frequently reported ice events are those that occurred between the mid-1930s (when many gage records were begun) and the early 1960s. A second bias is in the location of ice events included in the database, which are primarily the sites of USGS water-stage gages. Ice events that occur away from USGS gages are not yet well represented. Gage records rarely provide information on the thickness, extent, likely causes, or damages associated with a particular ice event, although they often provide such useful information as local stage and discharge.</p> <p>Because the Ice Jam Database is a work in progress, user input is very important, both in expanding and correcting information included in the database and in expanding the number of ice jam events listed. To correct or add to a particular entry, please mark the full printed record and send it to Dr. Kathleen White at CRREL, 72 Lyme Road, Hanover NH 03755-1290. If you know of events that are not included in the database, either supply the appropriate information (please list references) in a format suitable for data entry, or send a copy of the reference to Dr. White. The database is updated annually to reflect changes and additions supplied by users.</p>
ERDC POC	<p>Kathleen D. White, PhD, PE; CEERD-RN email: Kathleen.D.White@erdc.usace.army.mil Phone: 603-646-4187</p>
Distribution Source	The Ice Jam Database is available on the World Wide Web.
Available Documentation	<p>USACE (1994) Engineering and design—Ice jam flooding: Causes and possible solutions. Pamphlet No. 1110-2-11 (http://www.usace.army.mil/publications/eng-pamphlets/ep1110-2-11/toc.htm)</p> <p>White, K.D. (1996) A new ice jam database. <i>Journal of the American Water Resources Association</i>, Vol. 32, No. 2, p. 341–348.</p> <p>White, K.D., and H.J. Eames (1999) CRREL ice jam database. CRREL Report 99-2 (http://www.crrel.usace.army.mil/techpub/CRREL_Reports/html_abstracts/Cat_D_abstracts.html#icejam). (860 K pdf)</p>
Available Training	Training is not necessary to use or input data to the Ice Jam Database.